*tudinal axis*, and (p. 9) that *the ventral surface of the embryo corresponds to the ventral surface of the parent*, and, further (p. 11), that the embryo adheres to the mother by the end of the peduncle. When, therefore, Nitsche complains that, owing to my inaccurate statements, orientation is not possible, he has certainly not been sufficiently careful. Vogt's reproach also, that my drawings are "plus que schématiques," is not correct. Certainly, as Vogt could discover in the younger buds no cells, but only amorphous sarcode masses, while *my figures give the most accurate outlines of the cells according to their form, number, and arrangement*, such as are to be found in none of the other memoirs, his statement is intelligible. My figures on plate iii. are therefore all concordantly oriented; and I do not merely appear to suppose, as Nitsche says, that in all the figures the upper and lower ends of the drawings are equivalent, but they are equivalent. If therefore, where my successors show a few indistinct cell-like bodies as the mesoderm, I, in my figures, show distinct cells coming together, and the mesoderm developing itself from the ectoderm before our eyes, I am bold enough to regard this as an excellence of my work.

Of the development of *Loxosoma* we at present unfortunately know only fragments. The complete series of observations which J. Barrois appears to have before him are still delayed in publication. My question whether the organs designated by *o* in my figure of the swarming larva (Taf. ii. fig. 25), repeated in the 'Thierleben' (p. 181, fig. *b*), are provisional eyes, I now retract. It seems to me more correct to suppose that these two dark ovate bodies are the bud-stocks, which appear so early in the bud.

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XLV.—*On* Pharetronema zingiberis, *a new Genus and Species of Renierid Sponge*. By W. J. Sollas, M.A., F.G.S., &c.

[Plate XXX.]

*Pharetronema zingiberis* (mihi).

(Examined in the dried state.)

*Sponge* single, attached?, stipitate, in general form palmato-digitate or hand-shaped; stem short and compressed, widening about one inch above its base into an irregular palmate expansion, which is slightly curved from side to side and divides into a number of irregular cylindrical or com-

pressed nodulose finger-like branches (Pl. XXX. fig. 1). Branches bifurcating near their extremities, uniting where grown in contact, terminated by smooth ends, or more usually by the frayed ends of the skeletal fibres. Surface smooth on the outer or convex side, irregularly embossed with gently rounded eminences; on the inner or concave side irregularly wrinkled concentrically with the base. Oscules and pores inconspicuous.

*Skeleton* consists of (1) an internal and dermal network of spicular fibres, and (2) of dispersed flesh-spicules. Fibres of the internal network chiefly following a longitudinal direction, radiating upwards and outwards, to end against the surface of the sponge in the dermal layer; composed of spicules of one kind, viz. slender, straight or slightly curved acerates, more or less sharply pointed, 0·0117 inch long and 0·00035 inch in breadth (Pl. XXX. figs. 5, 6, 8), lying together side by side in an axial direction, with overlapping ends, somewhat like the woody cells of a flax fibre (Pl. XXX. fig. 3). Dermal network formed by the arching over and joining together of the ends of the internal fibres into a superficial reticulation, which supports on its exterior face a layer of erect pencils of spicules (Pl. XXX. fig. 4). The spicular pencils, being given off from the underlying fibres, are arranged in rows, which follow approximately the form of the network below (Pl. XXX. fig. 2). Spicules of the superficial pencils of the same form as those of the internal fibre, but most of them much smaller (fig. 7). Meshes of the dermal network very minute, very slightly larger on the inner than on the outer face of the sponge. Meshes of the interior network coated with the dried sarcode of the sponge, in which are dispersed irregularly straight or once- or twice-curved filiform flesh-spicules, 0·008 inch long, and only just showing a double outline under a magnification of 435 diameters (fig. 9).

*Hab.* Marine.

*Loc.* Jamaica.

*Coll.* Bristol Museum.

*Obs.* This sponge was presented by Mr. Whereat to the Bristol Museum, where I found it labelled *Lobularia manus-diaboli*. In general appearance it bears a somewhat striking resemblance to a hand affected by gout, so that the specific name "*manus-diaboli*" might be considered not inappropriate; but as it is too long for convenient use, I have replaced it by "*zingiberis*," in allusion to the ginger-like form of the branches.

The ends of the branches are seldom neatly rounded off and covered over with the dermal layer; on the contrary they

usually exhibit the internal skeleton uncovered, either as a projecting tuft of frayed fibres, or as forming the sides of a conical cavity excavated axially from the end of the branch inwards.

The absence of distinct oscules and aquiferous canals, together with the incomplete closure of the ends of the branches and the greater openness of the internal skeleton along lines radiating from the centre of the branches obliquely forwards and outwards, lead one to conjecture whether the external water, after finding access to the interior of the sponge through the pores of the dermal layer, may not have found its way outwards along the lines of least obstruction in the skeleton, and finally have discharged itself by the more or less open ends of the branches. This, however, is merely conjecture; and without actual observation of the sponge in the living state one cannot expect the nature of its water-circulation to be made clear.

The variations in form of the spicules are chiefly manifested in the character of their terminations. The somewhat sharp points of fig. 5 are the most usual; but very frequently the termination is more abrupt, and we have the conical form of fig. 12; this readily passes into the shouldered and pointed end of fig. 11, a very common form of termination, which, by losing its mucrone, passes into the rounded-off ends of the rare form (fig. 14). The tendency of these variations appears to be in the direction of lateral development towards the point, which, in its most exaggerated form, is shown by the pin-headed spicule of fig. 13, of which a few instances have been observed.

Budding occurs occasionally, as in fig. 10, where the small offshoot on the left side of the spicule is mucronate, like the normal point of the spicule, though the latter, in this case, is twice shouldered, or diminishes to a point by two stages.

There is an obvious resemblance between this recent sponge and the extinct *Pharetrospongia* of the Cambridge Greensand: the thickness of the plate-like wall in the one is very nearly the same as that of the palmate expansion of the other; both possess a spiculo-fibrous reticulate skeleton; both are distinguished by the inconspicuous character of their oscules and excretory canals; both agree in the form and size of their spicular elements; and the only marked differences which distinguish them are to be found in the branched form of the recent sponge, and the absence of flesh-spicules in the fossil one. The chance of flesh-spicules being preserved in the fossil state is so remote, however, that *Pharetrospongia*, if it originally possessed them, would certainly betray no signs of

the fact now; and hence the absence of such spicules in the fossil sponge proves nothing one way or the other; they may, or, just as possibly, they may not have been present in the living form. But while this uncertainty prevents us from placing the sponge just described in the same genus as *Pharetrospongia*, we need not be deterred by a difference of so slight a value as that of external form, while so many and marked resemblances exist between the two sponges, from placing them very near one another in our classification; and there is no reason why this approximation should not be indicated by a similarity in their generic names.

## EXPLANATION OF PLATE XXX.

*Fig.* 1. *Pharetronema zingiberis* (n. gen. et sp.), $\frac{2}{5}$ nat. size. From a photograph.
*Fig.* 2. Fragment of the dermal layer. × 25 diameters.
*Fig.* 3. Spicular fibres of the internal network, showing their mode of branching and anastomosing. *a*, adherent sarcode containing flesh-spicules. × 25.
*Fig.* 4. Fibres terminating in the dermal network. *a*, layer of arches or vaults formed by the curving together and junction of the internal fibres; *b*, layer of spicular pencils. × 25.
(Figs. 5–14 all magnified 435 diameters.)
*Fig.* 5. Spicule of the fibre, typical size and shape.
*Fig.* 6. Similar spicule, but smaller, from the dermal layer.
*Fig.* 7. Very common variety, mucronate at one end.
*Fig.* 8. Straight form of typical spicule.
*Fig.* 9. Flesh-spicules, one on the left straight, the other two curved.
*Fig.* 10. Variety of fibre-spicule with a mucronate bud and a "mucronated mucrone" for a point.
*Fig.* 11. Mucronate point commonly assumed by the fibre-spicules.
*Fig.* 12. Conical point, also common.
*Fig.* 13. Variety with a spherical head and a mucronate point.
*Fig.* 14. Variety with both ends rounded off.
*Fig.* 15. Longitudinal section of a branch, showing the radiate arrangement of the skeletal fibres (nat. size).

The Museum, Bristol,
Oct. 7, 1878.

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## XLVI.—*Notes on Foraminifera.*

By H. J. Carter, F.R.S. &c.

For the better understanding of what I am about to mention respecting some of the Foraminifera that I have lately described, it is desirable to premise the following brief epitome of their general organization and structure.

Dujardin was the first to point out their real nature, by stating, in 1835, that their soft parts were composed of granu-